

Data Validation and Data Quality Assessment Report

Log Pond Year 2 Cap Monitoring
Project Number: 020030-01

Prepared for:

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Approved for Release:



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1.0 Introduction

This report presents the EPA Level III validation of the sample analyses listed in Table 1. The well point water analyses were performed by Frontier Geosciences, Inc., located in Seattle, Washington. With the exception of grain size, the sediment analyses were performed by Analytical Resources, Incorporated, located in Seattle Washington. The grain size analyses were performed by Rosa Environmental and Geotechnical Laboratory, L.L.C., located in Seattle, Washington. The validation was performed in accordance with the procedures established in the *Contract Laboratory Program National Functional Guidelines for Inorganic and Organic Data Review* (Functional Guidelines) (USEPA 1994, 1999). Data quality objectives, project detection limits, and quality control (QC) sample frequencies are from *Appendix C Operations, Maintenance and Monitoring Plan Interim Remedial Action Log Pond Cleanup/Habitat Restoration* (OMMP) (Anchor Environmental 2001). The criteria used to qualify data are from Functional Guidelines, the OMMP, the analytical methods, or the professional judgment of the validation chemist.

Sections 2 through 5 present the validation findings and Section 7 defines the data qualifiers. Section 6 evaluates the project data against the data quality objectives set forth in the OMMP. Table 2 presents a summary of the qualified data. Copies of laboratory communications are presented in Appendix A. Data qualifier flags have been added to the sample results in the original reports and the Anchor data table.

Table 1
Sample Data Reviewed

Sample ID	Matrix	Laboratory Sample ID	SVOA	Mercury	Conventionals
WP-1D	Water	WP-1D		X	
WP-1T	Water	WP-1T		X	
WP-1	Water	WP-1			X
WP-2D	Water	WP-2D		X	
WP-2T	Water	WP-2T		X	
WP-2	Water	WP-2			X
FD-99	Water	FD-99		X	
SS-76	Sediment	EJ34A	X	X	X
SS-301	Sediment	EJ34B	X	X	X
SS-40	Sediment	EJ34C	X	X	X
SS-75	Sediment	EJ34D	X	X	X
WP-1	Sediment	EJ34E	X	X	X
WP-2	Sediment	EJ34F	X	X	X
AN-999	Water	EJ34G	X	X	
AN-998	Water	EJ34H	X	X	

SVOA: Phenol, benzyl alcohol, 2- and 4-methylphenol, 2,4-dimethylphenol, benzoic acid, and pentachlorophenol by Method 8270 (USEPA 1996)

Mercury: Total mercury in sediment samples analyzed by Methods 7471A and 7470A (USEPA 1996); total and dissolved mercury in well point water samples analyzed by Method 1631 (USEPA 1999a)

Conventionals: Total solids by Method 160.3 (USEPA 1999a), total organic carbon by the Plumb Method (Plumb 1981), grain size by the PSEP Method (PSEP 1996), and total suspended solids by Method 2540-D (APHA 1998)

2.0 Review of Semivolatile Organics Analyses

2.1 Custody, Preservation, Holding Times, and Completeness – Acceptable with Qualifications

Except as noted below, all samples were extracted and analyzed within the required holding times. Sample custody was maintained as required and the samples were received intact and were properly preserved. The data packages are complete and contain results for all samples and tests requested on the chain-of-custody (COC).

Sample AN-998 was re-extracted due to laboratory error. The re-extraction was performed 1 day past the 14 day holding time. Since all the results of sample AN-998 are undetected, they have been qualified as estimated detection limit (UJ).

Sample ID	Analyte	Qualification	Quality Control Exceedance
AN-998	All	UJ	Extraction holding time exceeded

2.2 Instrument Tuning and Mass Calibration – Acceptable

The tuning compound decafluorotriphenylphosphate was analyzed at the required frequency and all relative abundance values are acceptable.

2.3 Initial Calibration – Acceptable

Initial calibrations were analyzed at the required frequency. The Functional Guidelines criteria of relative standard deviation values less than or equal to 30% and relative response factors greater than 0.05 were met for all target compounds.

2.4 Continuing Calibration – Acceptable

Calibration verifications were analyzed at the required frequency. The Functional Guidelines criteria of percent difference values less than or equal to 25 and relative response factors greater than 0.05 were met for all target compounds.

2.5 Blank Analyses – Acceptable

2.5.1 Method Blanks

Method blanks were analyzed at the required frequency and target compounds were not detected above the reporting limits.

2.5.2 Field Blanks

Samples AN-999 and AN-998 were identified as field blanks. Target compounds were not detected above the reporting limits in either field blank.

2.6 Surrogate Analyses – Acceptable

Surrogate compounds were added to all samples, blanks, and QC samples as required. All recovery values are within the OMMP criteria.

2.7 Matrix Spike/Matrix Spike Duplicate Analyses – Acceptable with Discussion

Except as noted below, matrix spike/matrix spike duplicates (MS/MSD) were analyzed at the required frequency and all percent recovery and relative percent difference (RPD) values are within the OMMP criteria.

MS/MSD analyses were not reported for the water samples. Data qualifiers are not required because the water samples are field QC samples and the laboratory control sample demonstrates the analytical system is in-control.

2.8 Laboratory Control Sample Analyses – Acceptable

One laboratory control sample was reported with each analytical batch and all percent recovery values are within the OMMP criteria.

2.9 Standard Reference Material Analyses – Acceptable

The laboratory analyzed the Sequim Bay Fortified Reference Sediment as a standard reference material. The results are acceptable and meet the criteria of within the 95% confidence interval.

2.10 Internal Standard Evaluation – Acceptable

Internal standards were added to all samples, blanks, and QC samples as required. The recovery and retention time criteria of Functional Guidelines were met.

2.11 Laboratory Reporting Limits – Acceptable

The OMMP target detection limits were met. The laboratory reporting limits are equal to or less than the target detection limits.

2.12 Field Duplicates

Field duplicates are not associated with this sample set.

2.13 Overall Assessment of Data Useability

The useability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable except where flagged with data qualifiers that modify the usefulness of the individual values.

3.0 Review of Mercury in Sediment by Methods 7470A and 7471A

3.1 Custody, Preservation, Holding Times, and Completeness – Acceptable

All samples were extracted and analyzed within the required holding times. Sample custody was maintained as required and the samples were received intact and were properly preserved. The data packages are complete and contain results for all samples and tests requested on the COC.

3.2 Initial Calibration – Acceptable

Initial calibrations were analyzed as required and all quality control checks meet Functional Guidelines requirements.

3.3 Calibration Verifications – Acceptable

Initial calibration verifications and continuing calibration verifications were analyzed at the required frequency. All Functional Guidelines criteria were met.

3.4 Blank Analyses – Acceptable

3.4.1 Method Blanks

Method blanks were analyzed at the required frequency. Mercury was not detected above the reporting limit.

3.4.2 Calibration Blanks

Calibration blanks were analyzed at the required frequency and mercury was not detected above the reporting limit.

3.4.3 Field Blanks

Samples AN-999 and AN-998 were identified as field blanks. Mercury was not detected above the reporting limit in either field blank.

3.5 Duplicate Sample Analyses – Acceptable with Discussion

Except as noted below, sample duplicate analyses were reported at the required frequency and all RPD values are within the OMMP criteria.

Sample duplicate analyses were not reported for the water samples. Data qualifiers are not required because the water samples are field QC samples.

3.6 Matrix Spike Analyses – Acceptable with Discussion

Except as noted below, matrix spike analyses were reported at the required frequency. All percent recovery values are within the OMMP criteria.

Matrix spike analyses were not reported for the water samples. Data qualifiers are not required because the water samples are field QC samples and the laboratory control sample demonstrates the analytical system is in-control.

3.7 Laboratory Control Sample Analyses – Acceptable

Laboratory control samples were reported with the water samples. All percent recovery values are within Functional Guidelines criteria.

3.8 Standard Reference Material Analyses – Acceptable

Standard reference materials were analyzed with the sediment samples. All results are within the OMMP criteria.

3.9 Laboratory Reporting Limits – Acceptable

The OMMP target detection limits were met. The laboratory reporting limits are equal to or less than the target detection limits.

3.10 Field Duplicates

Field duplicates are not associated with this sample set.

3.11 Overall Assessment of Data Useability

The useability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable.

4.0 Review of Total and Dissolved Mercury in Water by Method 1631

4.1 Custody, Preservation, Holding Times, and Completeness – Acceptable

All samples were extracted and analyzed within the required holding times. Sample custody was maintained as required and the samples were received intact and were properly preserved. The data package is complete and contains results for all samples and tests requested on the COC.

4.2 Initial Calibration – Acceptable

Initial calibrations were analyzed as required and all quality control checks met the method requirements.

4.3 Continuing Calibration – Acceptable

Calibration verifications were analyzed at the required frequency and met all method requirements.

4.4 Blank Analysis – Acceptable with Qualifications

4.4.1 Method Blanks

Except as noted below, reagent, instrument (bubbler), and method blanks were analyzed at the required frequency. All blanks are acceptable and meet the method criteria.

Instrument (bubbler) blanks were not analyzed after every sample as required by Method 1631. Data qualifiers are not recommended because acceptable instrument blanks were analyzed after every QC sample, demonstrating that instrument carryover was minimal.

4.4.2 Field Blanks

Sample FD-99 was identified as a field filter blank. Dissolved mercury was detected in the field blank at 1.52 ng/L. Functional Guidelines prescribes three qualifications schemes for blank contamination, (1) associated sample concentrations greater than the action level (5 times the blank concentration) are not qualified, (2) associated sample concentrations less than the action level and greater than the reporting limit are qualified as undetected (U) at the reported value, and (3) associated sample concentrations less than the action level and less than the reporting limit are qualified as undetected (U) at the reporting limit. Only sample WP-2D contained levels that are greater than the reporting limit and less than the action level as shown below.

Sample ID	Analyte	Qualification	Quality Control Exceedance
WP-2D	Dissolved mercury	U at reported value	Result is greater than the reporting limit and less than 5 times the field blank level

4.5 Laboratory Control Sample Analyses – Acceptable

Laboratory control samples (quality control samples) were analyzed at the required frequency. The percent recovery values are acceptable.

4.6 Matrix Spike/Matrix Spike Duplicate Analyses – Acceptable

MS/MSD analyses were reported at the correct frequency and all percent recovery and RPD values are with the OMMP criteria.

Sample WP-1T was analyzed as the MS/MSD and sample duplicate with acceptable results.

4.7 Laboratory Reporting Limits – Acceptable with Discussion

The OMMP target detection limits were met. The laboratory reporting limits are equal to or less than the target detection limits.

The laboratory reported all sample results as total mercury, even though several samples were field filtered. The field filtered sample results represent dissolved mercury.

4.8 Field Duplicates

Field duplicates are not associated with this sample set.

4.9 Overall Assessment of Data Useability

The useability of the data is based on the EPA guidance documents noted previously. Upon consideration of the information presented here, the data are acceptable, except where flagged with data qualifiers that modify the usefulness of the individual values.

5.0 Review of Conventional Parameters

5.1 Custody, Preservation, Holding Times, and Completeness – Acceptable with Qualifications

Except as noted below, all samples were analyzed within the required holding times. Sample custody was maintained as required and the samples were received intact and were properly preserved. The data packages are complete and contain results for all samples and tests requested on the COC forms.

The total suspended solids analyses were performed two days past the 7-day holding time established by the method. Frontier Geosciences were contacted and replied that their standard operating procedure allows for a 14-day holding time. The total suspended solids results have been qualified as estimated (J).

Sample ID	Analyte	Qualification	Quality Control Exceedance
WP-1 WP-2	Total suspended solids	J	Analysis holding time exceeded

5.2 Initial Calibration – Acceptable

Initial calibrations were analyzed as required and all quality control checks are acceptable.

5.3 Calibration Verifications – Acceptable

Initial calibration verifications and continuing calibration verifications were analyzed at the required frequency. All quality control criteria were met.

5.4 Blank Analyses – Acceptable

5.4.1 Method Blanks

Method blanks were analyzed at the required frequency and target analytes were not detected above the reporting limits.

5.4.2 Field Blanks

The field blanks were not analyzed for conventional parameters.

5.5 Duplicate Sample Analyses – Acceptable

Sample duplicate analyses were analyzed at the required frequency and all RPD values are within the OMMP criteria.

5.6 Matrix Spike Analyses – Acceptable

Matrix spike analyses were reported at the required frequency and all percent recovery values are within the OMMP criteria.

5.7 Laboratory Control Sample Analyses – Acceptable

Laboratory control samples were analyzed at the required frequency. The percent recovery values are acceptable.

5.8 Standard Reference Material Analyses – Acceptable

Standard reference material results were reported for TOC. The recovery values are within the OMMP criteria.

5.9 Laboratory Reporting Limits – Acceptable

The OMMP target detection limits were met. The laboratory reporting limits are equal to or less than the target detection limits.

5.10 Field Duplicates

Field duplicates are not associated with this sample set.

5.11 Overall Assessment of Data Useability

The useability of the data is based on the EPA guidance documents listed above. Upon consideration of the information presented here, the data are acceptable except where flagged with data qualifiers that modify the usefulness of the individual values.

6.0 Assessment of Data Quality Objectives

6.1 Precision

Precision is a measure of the mutual agreement among individual measurements of the same property, under prescribed similar conditions. Precision is determined through analysis of matrix spike/matrix spike duplicates, sample duplicates, and field duplicate samples. Duplicate samples

are evaluated for precision in terms of relative percent difference. Relative percent difference is defined as the difference between the duplicate results divided by the mean and expressed as a percent.

The precision of the data meets the data quality objective of the OMMP. For the semivolatile organics, mercury (water and sediment), and the conventional parameters, the MS/MSD and laboratory duplicate RPD values are within the OMMP criteria. Field duplicates are not associated with this sample set.

6.2 Accuracy

Accuracy is the degree of agreement between a measurement and the accepted reference or true value. The level of accuracy is determined by examination of surrogates, matrix spikes, matrix spike duplicates, laboratory control samples, standard reference materials, method blanks, and field blanks. The surrogate, matrix spike, matrix spike duplicate, laboratory control samples, and standard reference material recovery values were compared to the criteria set forth in the OMMP, Functional Guidelines, or the analytical method. Method and field blanks are analyzed to identify compounds that could be introduced during the sampling, laboratory extraction, or analysis phase (i.e., laboratory contaminants) and lead to inaccurate results.

The accuracy of the semivolatile organics, mercury in sediment and conventional data meets the data quality objective of the OMMP. The recovery values of the matrix spike, laboratory control samples, and standard reference materials are acceptable and the method blanks and field blanks are free of contamination.

The accuracy of the mercury in sediment data meets the data quality objective of the OMMP. The filter blank contained reportable levels of dissolved mercury. The impact of the field blank contamination has been minimized by the proper use of data qualifiers as prescribed by Functional Guidelines. Qualifying contaminants in the associated samples as undetected when their concentration is less than five times the blank concentration minimizes the possibility of false positive results. All matrix spike and laboratory control sample recovery values are acceptable and the method blanks are free of contamination.

6.3 Representativeness

Representativeness is the extent to which the data reflect the actual contaminate levels present in the samples. Representativeness is assessed through method and field blanks, and proper preservation and handling. Method and field blank analyses allow for the detection of artifacts that may be reported as false positive results. Proper sample preservation and handling ensure that sample results reflect the actual sample concentrations.

The data are assumed to be representative, with the exception of results from analyses that were performed past the holding time. Since the results of tests performed past the holding time may not be representative, they were qualified as estimated. The field blank contamination does not affect the representativeness of the data since the procedures in Functional Guidelines were followed to minimize the impact of the contamination. The remaining data are representative

since the samples were analyzed within the required holding time, the samples were properly preserved and handled, and method blank contamination was not present.

6.4 Comparability

Comparability is a measure of how easily the data set can be compared and combined with other data sets. The data are assumed to be comparable since standard EPA methods were used to analyze the samples, the method QC criteria were met, and routine detection limits were reported.

6.5 Completeness

Completeness is expressed as the ratio of valid results to the amount of data expected to be obtained under normal conditions. Completeness is determined by assessing the number of samples for which valid results were obtained versus the number of samples that were submitted to the laboratory for analysis. Valid results are results that are determined to be usable during the data validation review process.

The 100% completeness goal of the OMMP was met. The completeness of this data set is 100%, because all of the samples were analyzed and all the results were determined to be valid.

7.0 Definition of Data Qualifiers

7.1 Inorganic Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are taken from Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA 1994).

- U The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- J The associated value is an estimated quantity.
- UJ The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
- R The data are unusable. (Note: Analyte may or may not be present.)

7.2 Organic Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are taken from Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 1999).

- U The analyte was analyzed for but not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the samples and meet quality control criteria. The presence or absence of the analyte cannot be verified.

8.0 References

- Anchor Environmental. 2001. Completion Report - Interim Remedial Action Log Pond Cleanup/Habitat Restoration Project, Appendix C Operations, Maintenance and Monitoring Plan Interim Remedial Action Log Pond Cleanup/Habitat Restoration, Bellingham, Washington. May 29, 2001.
- APHA. 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. American Public Health Association. 1998.
- Plumb. 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Technical Report EPA/CE-81-1. U.S. Army Corps of Engineers, Vicksburg, MS.
- PSEP. 1996. Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound. Prepared for the U.S. Environmental Protection Agency Region 10, Seattle, WA. January 1996.
- USEPA. 1994. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. United States Environmental Protection Agency. Office of Solid Waste and Emergence Response. February 1994.

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USEPA 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. EPA540/R-99/008. October 1999.

USEPA 1999a. *Methods and Guidance for Analysis of Water*, Version 2.0. United States Environmental Protection Agency Office of Science and Technology. EPA 821-C-99-004. CD ROM. June 1999.

Table 2
Summary of Qualified Data

Sample ID	Analyte	Qualifier	Reason for Qualification
AN-998	Phenol	UJ	Extraction holding time exceeded
	Benzyl alcohol	UJ	
	2-methylphenol	UJ	
	4-methylphenol	UJ	
	2,4-dimethylphenol	UJ	
	Benzoic acid	UJ	
	Pentachlorophenol	UJ	
WP-2D	Dissolved mercury	U at reported value	Result is greater than the reporting limit and less than 5 times the field blank level
WP-1	Total suspended solids	J	Analysis holding time exceeded
WP-2		J	

Appendix A

Laboratory Communications
(1 page)

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COMMUNICATION RECORD

Date: 7.8.02	<input checked="" type="checkbox"/> Phone in
Time:	<input type="checkbox"/> Phone out
Person communicated with: M.B. Miller	
Affiliation: Frontier Geosciences	
Project: TSS Hold time	
Subject: Anchor GP LP Round 2	
By: Kathy J. Gunderson	

Remarks:
Their SOB hold time is 14 days.
Lucas, PM, on vacation. He's unaware of SOW/QAPP.
fax # 206-622-6876
Action required:
fax SOW/QAPP page w/ hold time info
Action taken:
faxed 7.8.02

By: KJG

